

**COMPLEMENTARY SILICON POWER
DARLINGTON TRANSISTORS**

- SGS-THOMSON PREFERRED SALESTYPES
- COMPLEMENTARY PNP - NPN DEVICES
- MONOLITHIC DARLINGTON CONFIGURATION
- INTEGRATED ANTIPARALLEL COLLECTOR-EMITTER DIODE

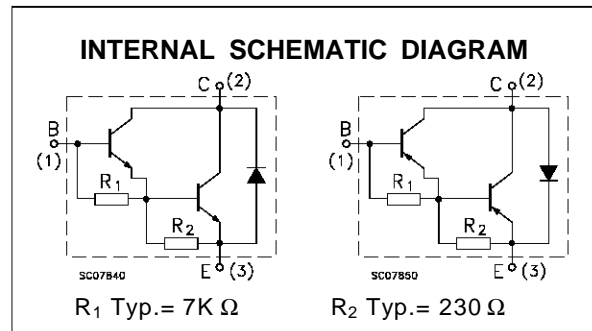
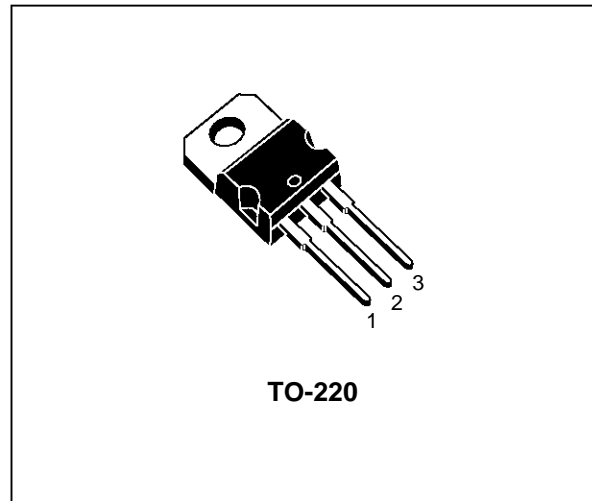
APPLICATIONS

- LINEAR AND SWITCHING INDUSTRIAL EQUIPMENT

DESCRIPTION

The TIP110 and TIP112 are silicon epitaxial-base NPN transistors in monolithic Darlington configuration mounted in Jedec TO-220 plastic package. They are intended for use in medium power linear and switching applications.

The complementary PNP types are TIP115 and TIP117.



ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | | Unit | |
|-----------|--|-------|------------|------|------------|
| | | NPN | TIP110 | | TIP112 |
| | | PNP | TIP115 | | TIP117 |
| V_{CBO} | Collector-Base Voltage ($I_E = 0$) | | 60 | 100 | V |
| V_{CEO} | Collector-Emitter Voltage ($I_B = 0$) | | 60 | 100 | V |
| V_{EBO} | Emitter-Base Voltage ($I_C = 0$) | | 5 | | V |
| I_C | Collector Current | | 2 | | A |
| I_{CM} | Collector Peak Current | | 4 | | A |
| I_B | Base Current | | 50 | | A |
| P_{tot} | Total Dissipation at $T_{case} \leq 25^\circ C$ $T_{amb} \leq 25^\circ C$ | | 50 | | W |
| | | | 2 | | W |
| T_{stg} | Storage Temperature | | -65 to 150 | | $^\circ C$ |
| T_j | Max. Operating Junction Temperature | | 150 | | $^\circ C$ |

* For PNP types voltage and current values are negative

TIP110/TIP112/TIP115/TIP117

THERMAL DATA

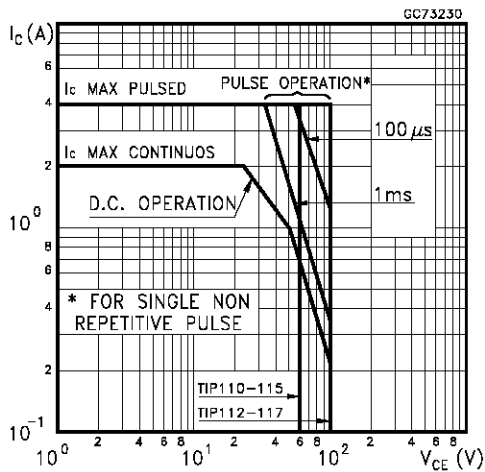
| | | | | |
|----------------|-------------------------------------|-----|------|---------------|
| $R_{thj-case}$ | Thermal Resistance Junction-case | Max | 2.5 | $^{\circ}C/W$ |
| $R_{thj-amb}$ | Thermal Resistance Junction-ambient | Max | 62.5 | $^{\circ}C/W$ |

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}C$ unless otherwise specified)

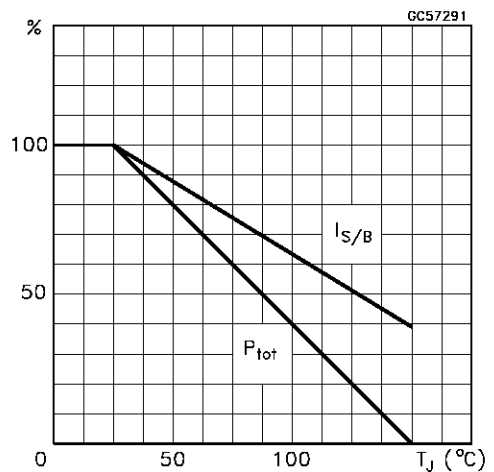
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|------------------|--|---|-------------|------|------|--------|
| I_{CEO} | Collector Cut-off Current ($I_B = 0$) | $V_{CE} = \text{Half Rated } V_{CEO}$ | | | 2 | mA |
| I_{CBO} | Collector Cut-off Current ($I_E = 0$) | $V_{CB} = \text{Half Rated } V_{CBO}$ | | | 1 | mA |
| I_{EBO} | Emitter Cut-off Current ($I_C = 0$) | $V_{EB} = 5 V$ | | | 2 | mA |
| $V_{CEO(sus)}^*$ | Collector-Emitter Sustaining Voltage ($I_B = 0$) | $I_C = 30 \text{ mA}$ for TIP110/115 for TIP112/117 | 60 100 | | | V |
| $V_{CE(sat)}^*$ | Collector-Emitter Saturation Voltage | $I_C = 2 A$ $I_B = 8 \text{ mA}$ | | | 2.5 | V V |
| V_{BE}^* | Base-Emitter Voltage | $I_C = 2 A$ $V_{CE} = 4 V$ | | | 2.8 | V |
| h_{FE}^* | DC Current Gain | $I_C = 1 A$ $V_{CE} = 4 V$ $I_C = 2 A$ $V_{CE} = 4 V$ | 500 1000 | | | |

* For PNP types voltage and current values are negative.

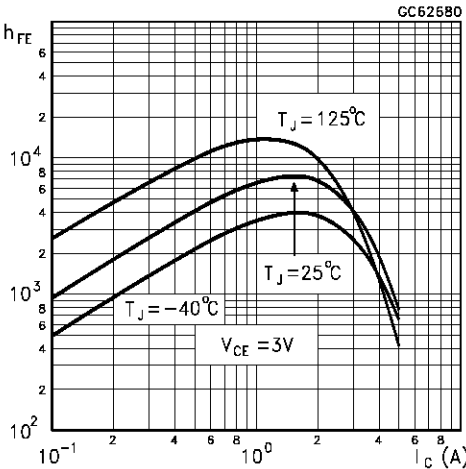
Safe Operating Areas



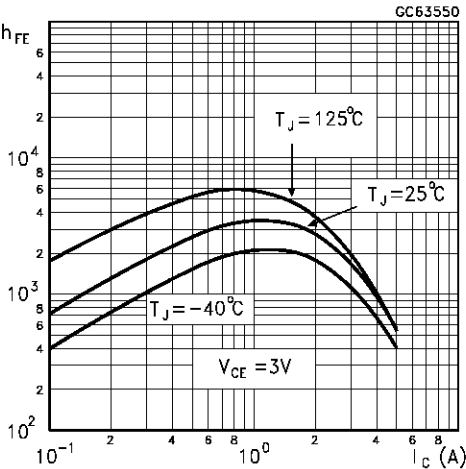
Derating Curve



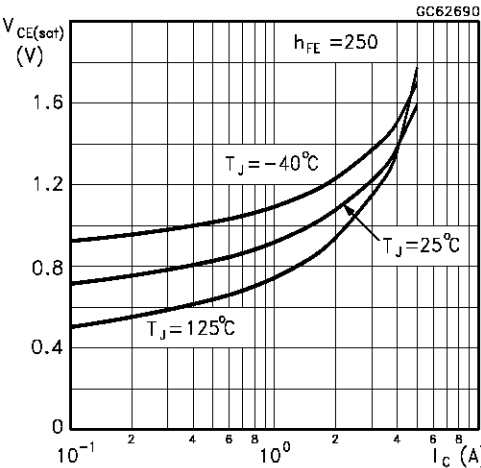
DC Current Gain (NPN type)



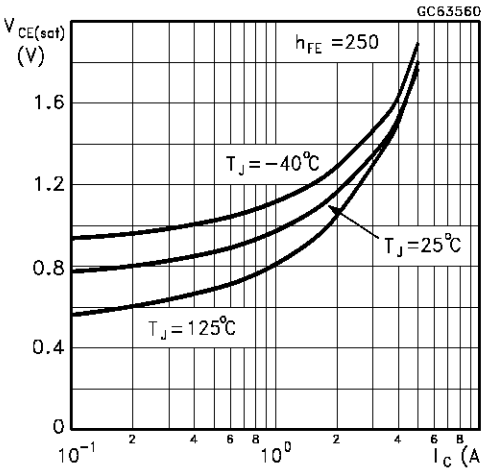
DC Current Gain (PNP type)



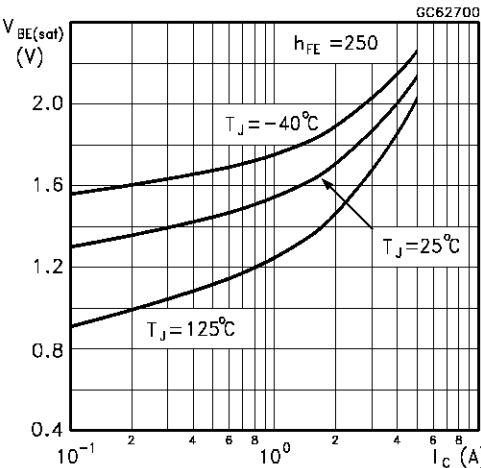
Collector-Emitter Saturation Voltage (NPN type)



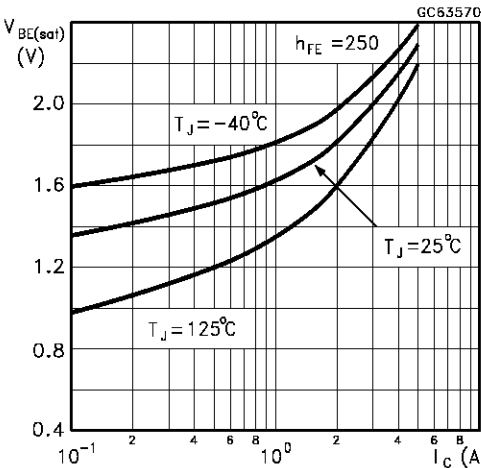
Collector-Emitter Saturation Voltage (PNP type)



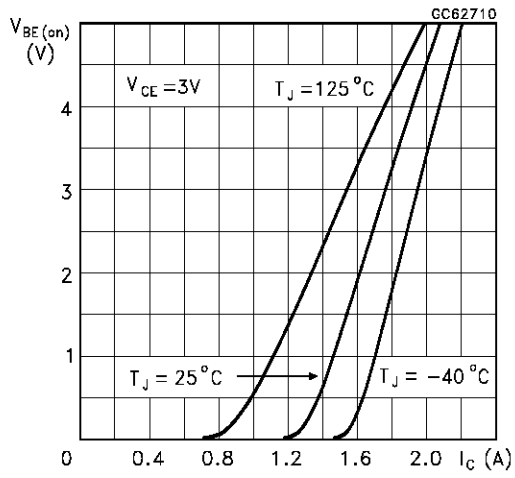
Base-Emitter Saturation Voltage (NPN type)



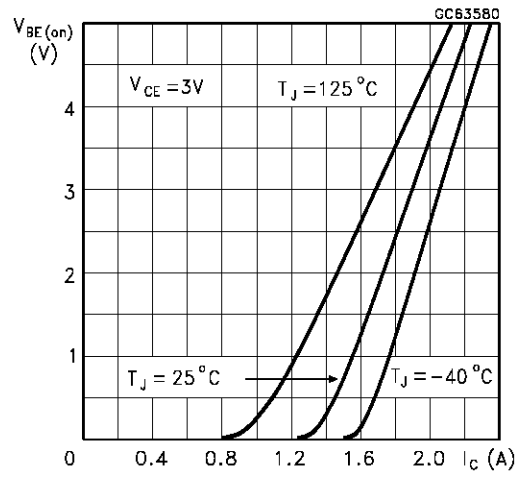
Base-Emitter Saturation Voltage (PNP type)



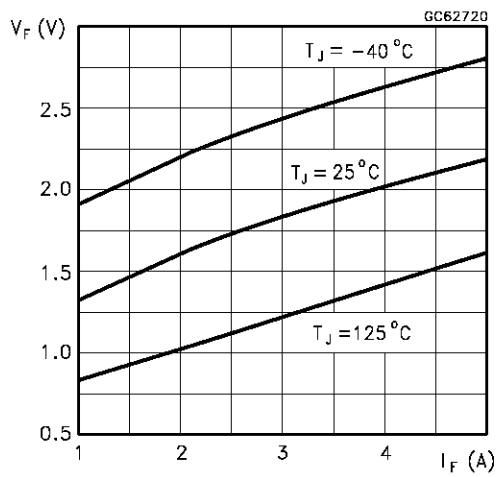
Base-Emitter On Voltage (NPN type)



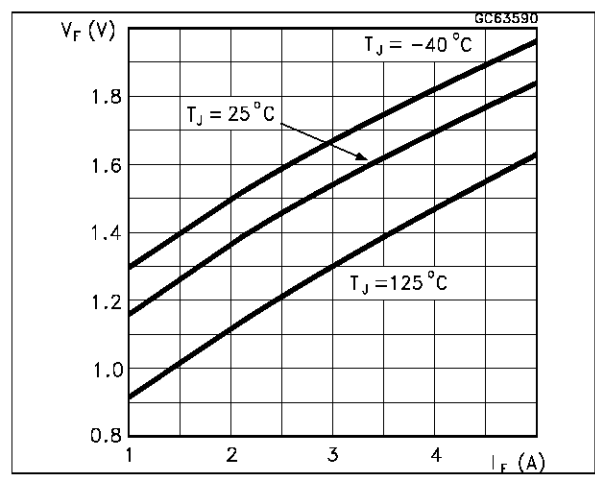
Base-Emitter On Voltage (PNP type)



Freewheel Diode Forward Voltage (NPN types)



Freewheel Diode Forward Voltage (PNP types)



TO-220 MECHANICAL DATA

| DIM. | mm | | | inch | | |
|------|-------|------|-------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 4.40 | | 4.60 | 0.173 | | 0.181 |
| C | 1.23 | | 1.32 | 0.048 | | 0.051 |
| D | 2.40 | | 2.72 | 0.094 | | 0.107 |
| D1 | | 1.27 | | | 0.050 | |
| E | 0.49 | | 0.70 | 0.019 | | 0.027 |
| F | 0.61 | | 0.88 | 0.024 | | 0.034 |
| F1 | 1.14 | | 1.70 | 0.044 | | 0.067 |
| F2 | 1.14 | | 1.70 | 0.044 | | 0.067 |
| G | 4.95 | | 5.15 | 0.194 | | 0.203 |
| G1 | 2.4 | | 2.7 | 0.094 | | 0.106 |
| H2 | 10.0 | | 10.40 | 0.393 | | 0.409 |
| L2 | | 16.4 | | | 0.645 | |
| L4 | 13.0 | | 14.0 | 0.511 | | 0.551 |
| L5 | 2.65 | | 2.95 | 0.104 | | 0.116 |
| L6 | 15.25 | | 15.75 | 0.600 | | 0.620 |
| L7 | 6.2 | | 6.6 | 0.244 | | 0.260 |
| L9 | 3.5 | | 3.93 | 0.137 | | 0.154 |
| DIA. | 3.75 | | 3.85 | 0.147 | | 0.151 |

